

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **Brian Gibson, et al.** Examiner: **William K. Cheung**

Application No.: **10/766,430**

Group Art: **1713**

Filing Date: **January 28, 2004**

Attorney Docket No.: **H0003690**

For: **EXTRUDABLE PVC COMPOSITIONS**

Commissioner for Patents
Alexandria, VA 22313-1450

THIRD RULE 132 DECLARATION OF FRED DURRENBERGER

I, Fred Durrenberger, declare and state that:

1. I am an inventor in the above-referenced patent application. I hold a B.S. degree in Chemical Engineering (1978) from University of Missouri-Rolla College. I have been employed by Honeywell International, Inc. and/or its predecessor in interest, the assignee of the application, since about 1992 holding various positions, including my current position as Director of Technology in the Wax and Additives Group. I have extensive experience and familiarity with the development of the extrusion methods and compositions which are the subject of the claims pending in this application.
2. I am familiar with the prosecution history of the above-mentioned patent application and understand that the claims under consideration in this application (as amended as of the date of this filing).
3. I tested and/or supervised the testing of several materials for the purpose of evaluating the degree of ester substitution in each. The three materials identified in the following table, namely RL-755, S-170 and S-1670 were obtained from commercial sources. RL-755, S-170 and S-1670 are sugar esters prepared by reacting fatty acid (stearic acid), or esters thereof, with the disaccharide, sucrose. There are eight hydroxyl groups in the sugar structure. Depending on processing conditions, esterification could yield mono- to octa-substituted products, or various mixtures of these esters.
4. We used various techniques in an effort to approximate the degree of ester substitution of these three materials. Based on this work we were able to determine, within a reasonable degree of confidence, the following:

- a. RL-755 is made up mostly (approximately 95%) of sucrose octa-stearate, with relatively minor content of lower-substitution analogs. We estimate the average degree of substitution to be about 7.5. This material is consistent with material indicated for use within the scope of the present invention, and the degree of substitution for this material is believed to be about the same as Sefose 1618, which is material in accordance with the present invention.
 - b. Ryoto S-170 is a complex mixture of isomers and variations in the number of stearate substituents, as evidenced by a very complex ¹³C-NMR spectrum with broad, split multiplets for the sucrose carbons. The average degree of stearate substitution is estimated to be approximately 4.8. The major components are most likely penta- and lower-substituted sucrose esters. We estimate that only about 2% or less of octa-substituted sucrose ester is present.
 - c. Ryoto S-1670 is predominantly sucrose mono-stearate ester, with relatively minor higher-substitution levels. We estimate that the average degree of stearate substitution is about 1.2.
5. The RL 755 and the S-1670 materials were tested for performance as lubricants. In addition, we formulated a combination of RL-755 and S-1670 in a 50:50 weight ratio to produce a composition estimated to contain approximately less than about 50% by weight of octa substituted esters. The results of testing on these materials are presented in the Table 1 below.

TABLE 1

Sucrose Ester Composition	Fusion Time* (s)	Fusion Torque (m-g)	Eq. Torque (m-g)	Eq. Temp. (°C)	Stability (s)
RL 755	96	2973	1797	211	968
S 1670	36	3936	1992	212	670
50:50 S 1670:RL 755	44	3583	1905	211	788

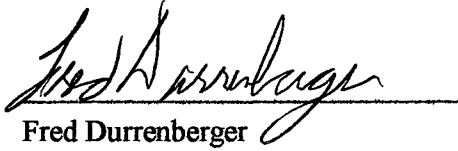
*elapsed time between fusion and measurable onset of cross-linking


6. I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true and further that the statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the

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United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.


Fred Durrenberger


Date

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